

Amdt. dated November 9, 2004
Reply to Office action of Sept. 9, 2004

Serial No. 09/535,859
Docket No. BLD990050US1
Firm No. 0036.0060

REMARKS/ARGUMENTS

In the "Office Action Summary", the Examiner indicated that claims 1-7, 15, 16, 18, 19, 21, 29-32, 34, and 39-52 were rejected. However, in the body of the Final Office Action, the Examiner found that claims 3, 6, 8-14, 37, and 38 would be allowed if rewritten in independent form. (Final Office Action, pg. 6) Applicants assume the Examiner's findings in the body of the Final Office Action control.

The Examiner allowed claims 17, 20-28, and 33-36.

The Examiner said he would allow claims 3, 6, 8-14, 37, and 38 if written in independent form. (Final Office Action, pg. 6) Applicants note that claims 3 and 6 were written in independent form in the previous amendment to include the requirements of the base and intervening claims. Thus, claims 3 and 6 are in condition for allowance in their current form.

Claim 7 was amended to depend from independent claim 3.

Claims 7-14 should be allowed because they depend from claim 3, which is patentable over the cited art for the above mentioned reasons.

The Examiner rejected independent claims 44 and 48

1. Claims 39-52 Comply with 35 U.S.C. §112, pars. 1 and 2

The Examiner rejected claims 39-52 as failing to comply with the enablement requirement of 35 U.S.C. §112, par. 1 on the grounds that the claims contain the term "article of manufacture" which the Examiner found is subject matter not described in the specification. (Final Office Action, pg. 2) Applicants traverse and submit that the Specification provides a definition and written description of the claim term "article of manufacture" on pg. 14, line 25 to pg. 15, line 7. Applicants submit that this disclosure and definition of "article of manufacture" in the Specification complies with 35 U.S.C. §112, par. 1 by providing adequate written description of the term "article of manufacture" to enable one skilled in the art to make and/or use the invention.

Accordingly, Applicants request the Examiner to withdraw the enablement rejection.

The Examiner further rejected claims 39-52 as indefinite under 35 U.S.C. §112, par. 2 on the grounds that the term "article of manufacture" is unclear. (Final Office Action, pgs. 2-3)

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Applicants traverse for the reasons discussed above on the grounds that the above cited Specification provides clear disclosure and definition of the claim term "article of manufacture".

The Examiner found that claims 41, 44, and 46-52 would be allowed if rewritten to overcome the rejections under 35 U.S.C. §112, pars. 1 and 2. (Final Office Action, pg. 7) Applicants submit that these claims are in condition for allowance in their current form because the rejection under 35 U.S.C. §112, pars. 1 and 2 should be withdrawn for the reasons discussed above.

2. Claims 1, 2, 4, 5, 7, 15, 16, 18, 19, 21, 39, 40, 42, 43, and 45 are Patentable Over the Cited Art

The Examiner rejected claims 1, 2, 4, 5, 7, 15, 16, 18, 19, 21, 39, 40, 42, 43, and 45 as anticipated (35 U.S.C. §102) by Bacon (U.S. Patent No. 4,280,144) Applicants traverse for the following reasons.

Amended claims 1, 15, and 39 concern reducing toner in an image comprised of raster pel data and require: determining surrounding pels of subject pels; for each subject pel, generating a sub-pulse width power to charge a sub-pel region within the subject pel based on a pattern of the surrounding pels of the subject pel, wherein the charged sub-pel region is less than a region of the subject pel; and for each subject pel, generating position information indicating an alignment of the sub-pel region in the pel, wherein the position information is used to position the sub-pel region produced by the sub-pulse width power in the pel.

Applicants amended claims 1, 15, and 39 as discussed during the phone interview to clarify that the charged sub-pel region is less than a region of the subject pel. Applicants submit that this amendment does not add new matter, but clarifies the definition of the charged sub-pel region. Applicants note that the Examiner indicated he would enter this amendment.

The Examiner cited Bacon's discussion of surrounding pixels (W, Y, Z and V) with respect to a subject PEL X. Bacon discusses how a coarse PEL X may be processed to reproduce the PEL X at a higher resolution by taking four sums of adjoining coarsely scanned PELs (W, Y, Z, and V) surrounding PEL X. (Bacon, col. 5, lines 7-10). Bacon discusses how a PEL X is subdivided into 4 sub-pels X(1-4), where the value of each sub-pel is based on the sum of one or more grey scale codes V', Y', W', and Z' that represent grey scale codes for PELs V,

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Y, W, and Z, respectively, that surround PEL X. The new PEL X is thus the sum of the four calculated sub-pels X(1-4). (Bacon, col. 5, lines 14-69).

Claims 1, 15, and 39 require reducing toner in an image. Nowhere does the cited Bacon anywhere disclose that its described technique for increasing resolution is used to reduce toner in an image. In fact, Bacon teaches away from reducing toner because Bacon mentions that its object is to reproduce a fine print of a coarsely scanned document from less information. (Bacon, col. 3, lines 6-10; col. 6, lines 49-54). The Examiner has not cited any part of Bacon that discloses reducing toner in an image as claimed.

Further, nowhere does the cited Bacon anywhere disclose the claim requirement that for each subject pel, generating a sub-pulse width power to charge a sub-pel region within the subject pel based on a pattern of the surrounding pels of the subject pel, where the charged sub-pel region is less than a region of the subject pel. Bacon discusses calculating sub-pels as X1, X2, X3, X4 shown in FIG. 4 that comprise the entire pel region of X'. Thus, the calculation of Bacon calculates the value for an entire pel, not a sub-pel region that is less than the region of the subject pel as claimed. Thus, Bacon teaches away from the claim requirement of looking at the pattern of the surrounding pels to generate a sub-pulse width power to charge a sub pel region that is less than the region of the subject pel. For this reason, Applicants's dispute the Examiner's findings in the Examiner Remarks (Final Office Action, pg. 7) that Bacon determines sub-pel values based on surrounding pels.

Moreover, the claims require that the sub-pulse width be determined based on a pattern of the surrounding pels of the subject pel. The cited Bacon does not determine sub-pel values, such as X(1-4), based on the pattern of surrounding pels, e.g., W, Y, Z, and V. Instead, Bacon calculates sub-pels values based on the grey code value of surrounding pels, not the pattern of surrounding pels as claimed.

In the Examiner's Remarks, the Examiner found that there is no language in the claims that recites reducing the toner in an image. (Final Office Action, pg. 7) Applicants traverse and note that the preamble of the independent claims 1, 15, and 29 recites "reducing toner in an image".

Accordingly, amended claims 1, 15, and 39 are patentable over the cited art because the cited Bacon does not disclose all the claim requirements.

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Claims 2, 4, 5, 7, 16, 18, 19, 21, 39, 40, 42, 43, and 45 are patentable over the cited art because they depend from one of claims 1 and 15, which are patentable over the cited art for the reasons discussed above. Moreover, claims 4 and 18 provide further grounds of patentability over the cited art.

Claims 4, 18, and 42 depend from claims 1, 15, and 39 and further require that for each subject pel, determining whether the pattern of the surrounding pels indicates that the subject pel is in a black filled region, wherein the position information is used to align the sub-pel region in the subject pel in the black filled region to be adjacent to the sub-pel region in one adjacent subject pel in the black filled region.

The Examiner cited the above discussed sub-pels X(1-4) of PEL X and the adjacent pels W, Y, V, and Z of PEL X as disclosing the additional requirements of claims 4, 18, and 42.

Applicants submit that the Examiner has not cited any section in Bacon that discloses determining whether a pattern of surrounding pels indicates that the subject pel is in a black filled region. In fact, the above cited Bacon discusses how to calculate sub-pels based on surrounding pel grey scale codes.

The Examiner cited FIG. 3 as disclosing this claim requirement. (Final Office Action, pg. 4) Applicants traverse. The cited FIG. 3 shows the range of grey level value within which a PEL may fall. (Bacon, col. 4, lines 6-7). Nowhere does the cited FIG. 3 disclose the claim requirement of determining from the pattern of surrounding pels whether the subject pel is in a black filled region.

Further, the Examiner has not cited any part of Bacon that discloses the claim requirement that the position information is used to align the sub-pel region in the subject pel in the black filled region to be adjacent to the sub-pel region in one adjacent subject pel in the black filled region.

FIG. 4 and col. 5, lines 38-55 of Bacon mentions that the sub-pels X(1-4) comprise subdivided regions of pel X. The Examiner has not cited any part of Bacon that discloses the claim requirement that the sub-pel in a black filled region is aligned to be adjacent to the sub-pel region in one adjacent subject pel in the black filled region.

Accordingly, claims 4, 18, and 42 provide additional grounds of patentability over the cited art because the cited Bacon does not disclose the additional requirements of these claims.

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3. Claims 29-32 are Patentable Over the Cited Art

The Examiner rejected claims 29-32 as anticipated (35 U.S.C. §102(b)) by Seto (U.S. Patent No. 5,646,670). Applicants traverse for the following reasons.

Amended claim 29 recites a computer-readable transmission medium including a look-up table data structure used for reducing toner in an image comprised of raster pel data, comprising: a plurality of output values, wherein one output value is provided for at least one pattern of pels including a subject pel, wherein the output value is substituted for the subject pel, and wherein the output value comprises a sub-pulse width power to charge a sub-pel region within the subject pel, wherein the charged sub-pel region is less than a region of the subject pel, and position information indicating an alignment of the sub-pel region in the pel, wherein the position information is used to position the sub-pel region produced by the sub-pulse width power in the pel.

Applicants amended claim 29 to include the requirement added to claims 1, 15, and 39 that the charged sub-pel region is less than a region of the subject pel.

The Examiner cited 8 distinct pulse widths of Seto as disclosing the claim requirement of a plurality of output values, wherein one output value is provided for at least one pattern of pels including a subject pel. (Final Office Action, pg. 5) Applicants traverse.

Seto mentions that LUT 1152 outputs an 8 bit data to a D/A converter to convert the data into an analog voltage signal. (Seto, col. 19, lines 20-25) Seto also mentions that the YMCK VDO signal from a color processor is corrected and outputted as an 8 bit signal to a pulse width modulator, which is converted by a D/A converter and outputted to an analog comparator. (Seto, col. 3, lines 37-45)

The Examiner cited sub-pulse width power 1159. (Final Office Action, pgs. 5-6) The cited 1159 comprises a wave generator 1159 that converts a clock having a tripled frequency into a triangular wave that is outputted into the comparators 1157-1158. (Seto, col. 19, lines 25-33) The cited FIG. 34 illustrates an outputted image that is reproduced to reduce toner. (Seto, col. 21, lines 24-37)

Nowhere does the above cited Seto anywhere disclose a plurality of output values, wherein one output value is provided for at least one pattern of pels including a subject pel.

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Further, nowhere does the cited Seto anywhere disclose substituting an output value based on the pattern of pels including a subject pel for the subject pel.

The Examiner cited FIG. 34 as disclosing the claim requirement that the output value is substituted for the subject pel. The cited FIG. 34 shows image output and discusses adding three scanning lines to reduce the toner output per unit area. (Seto, col. 21, lines 24-35) However, nowhere does the cited Seto disclose the claim requirement that the output value is substituted for the subject pel.

Accordingly, amended independent claim 29 is patentable over the cited art because the cited Seto does not disclose all the claim requirements.

Claims 30-32 and 34 are patentable over the cited art because they depend from claim 29, which is patentable over the cited art for the reasons discussed above. Moreover, the following of these dependent claims provide further grounds of patentability over the cited art.

Claim 31 depends from claim 29, and further requires that the position information clusters the sub-pel region of adjacent pels in order to reduce electromagnetic radiation.

The Examiner cited col. 9, line 12, col. 20, lines 19-24, 34-38, and 47-55 of Seto as disclosing the requirements of claim 31. (Final Office Action, pg. 6) Applicants traverse.

The cited col. 9 mentions that a latent image is developed using M color developer Dm as a first toner. The cited col. 20 mentions a printer having a toner-saving processor and various components thereof. The cited col. 20 further mentions how if the toner saving mode destination signal is 0, in non-toner saving mode, then a clock phase controller 1164 outputs a value. A selector output signal is outputted to the laser driver.

Although the cited Seto discusses operations of a toner saving processor, nowhere does the cited Seto anywhere disclose the claim requirement that the position information cluster the sub-pel region of adjacent pels in order to reduce electromagnetic radiation. Nowhere does the cited col. 9 anywhere disclose the claim requirement of clustering the sub-pel region of adjacent pels.

Accordingly, claim 31 provides additional grounds of patentability over the cited art because the cited Bacon does not disclose the additional requirements of these claims.

Claim 32 depends from claim 29 and further requires that the output values for subject pels in a black filled region include position information that aligns the sub-pel region in the

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subject pels in the black filled region to be adjacent to the sub-pel region in one adjacent subject pel in the black filled region. The Examiner cited FIG. 14b as disclosing the requirements of these claims. (Office Action, pg. 5) Applicants traverse.

The cited FIG. 14b illustrates printed pixels upon normal mode outputting, not toner saving mode. (Seto, col. 7, lines 19-20; col. 15, lines 11-28) Nowhere does the discussion in Seto concerning FIG. 14b disclose aligning sub-pels in a black filled region to be adjacent to the sub-pel region in one adjacent pel. Instead, FIG. 14b shows normal printed pels and nowhere does the above cited Seto disclose the claim requirements concerning how sub-pels are positioned in adjacent pels in a black filled region.

Further, although FIG. 14b may show sub-pels in pels adjacent to each other, nowhere does the discussion concerning FIG. 14b in Seto disclose including position information with output values for pels in a black filled region that aligns the sub pels in the pels adjacent to each other as claimed.

Accordingly, claim 32 provides additional grounds of patentability over the cited art because the cited Bacon does not disclose the additional requirements of these claims.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-52 are patentable over the art of record. Applicants submit that no additional fee is needed. Nonetheless, should any additional fees be required, please charge Deposit Account No. 50-0563.

The attorney of record invites the Examiner to contact him at (310) 553-7977 if the Examiner believes such contact would advance the prosecution of the case.

Dated: November 9, 2004

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